CLEAN
Central Zone

Contract No. N62474-88-D-5086

Contract Task Order 0095

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PRC Project Manager: Steven MacNeill

WELL DECOMMISSIONING REPORT
1943-1956 DISPOSAL AREA AND WEST BEACH LANDFILL
NAVAL AIR STATION ALAMEDA

January 23, 1992

Prepared By

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ADDENDUM 1

WELL DECOMMISSIONING REPORT 1943-1956 DISPOSAL AREA AND WEST BEACH LANDFILL

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1.0 INTRODUCTION

PRC Environmental Management, Inc. (PRC) has been requested by the Department of the Navy, Western Division Naval Facilities Engineering Command (WESTDIV), to decommission old ground-water monitoring wells at the 1943-1956 Disposal Area and West Beach Landfill, Naval Air Station (NAS) Alameda. This work is being performed under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract No. N62474-88-D-5086. The decommissioning of old ground-water monitoring wells was requested in addition to a Solid Waste Water Quality Assessment Test (SWAT) for the landfills. This report addresses only the ground-water monitoring well decommissioning.

1.1 BACKGROUND

NAS Alameda is located at the west end of Alameda Island in Alameda and San Francisco Counties, California. Alameda Island lies along the eastern side of San Francisco Bay, adjacent to the city of Oakland (Figure 1). NAS Alameda occupies 2,634 acres and is approximately 2 miles long and 1 mile wide. Most of the eastern portion of the air station is developed with offices and industrial facilities, while runways and support facilities occupy its western end.

Originally a peninsula, the land that is now Alameda Island was isolated from the mainland in 1876 when a channel was cut through the peninsula's isthmus linking San Leandro Bay with the main portion of San Francisco Bay. Dredging was conducted to deepen the channel and allow commercial and industrial traffic to and from the island's early industrial sites, which included an oil refinery and a borax processing plant.

The U. S. Army acquired the site from the city of Alameda in 1930 and began construction activities in 1931. In 1936, the U. S. Navy acquired title to the land and began construction of the air station in response to the military buildup in Europe prior to World War II. After the United States entered the war in 1941, additional land was acquired adjacent to the air station. Following the end of the war, the Navy's use of Alameda Island returned to its original primary mission of providing facilities and support for fleet aviation activities.

Two areas on the western side of the air station were utilized as landfills, namely the 1943-1956 Disposal Area and the West Beach Landfill (Figure 2). Both of these landfills are inactive. During the late 1970s and early 1980s, various investigations and designs for closure of the landfills were completed by the Navy in response to the requirements of the Regional Water

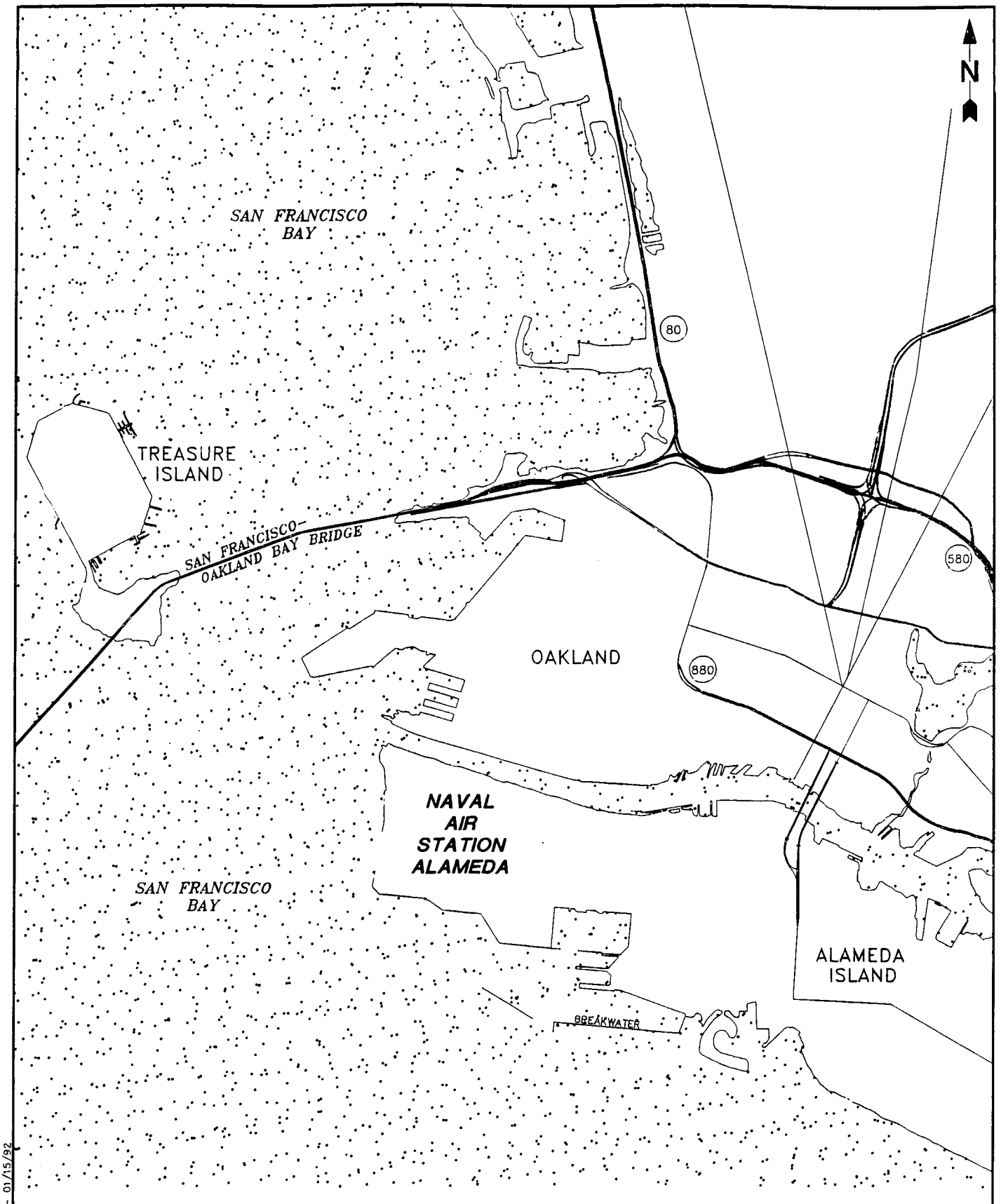
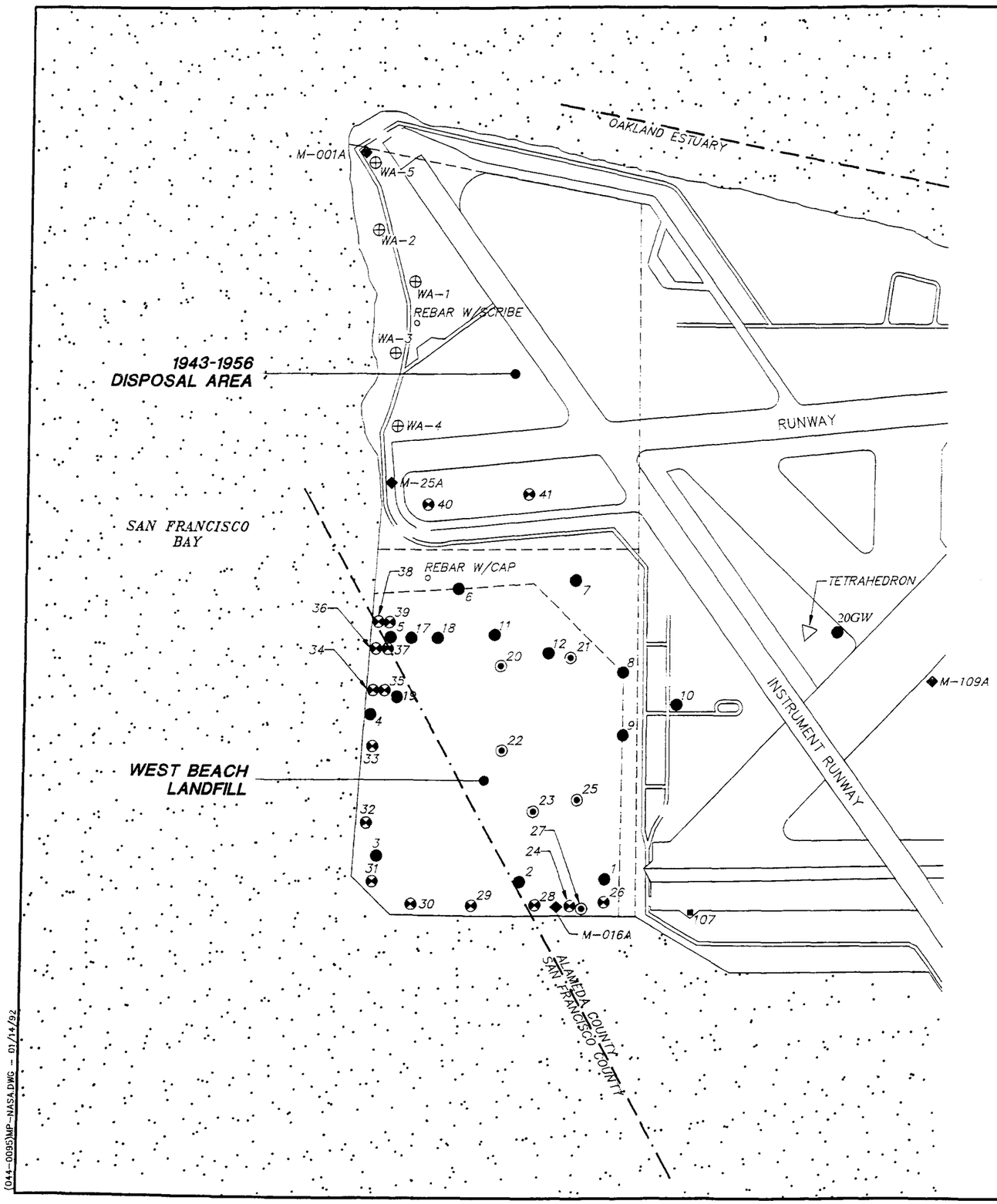


FIGURE 1

SITE LOCATION MAP
NAVAL AIR STATION
ALAMEDA, CALIFORNIA

(044-0095)NASA-LOC.DWG - 01/15/92



LEGEND

- MONITORING WELL INSTALLED BY HARDING LAWSON, 1976, 1977
- MONITORING WELL INSTALLED BY HARDING LAWSON, 1983
- MONITORING WELL INSTALLED BY WAHLER ASSOCIATES, 1985
- MONITORING WELL, NO INFORMATION AVAILABLE
- U.S.N. BRASS PLUG
- MONITORING WELL INSTALLED BY J.M. MONTGOMERY, 1991

0 850' 1700' 2550' 3400'

APPROXIMATE SCALE

(044-0095)MP-NASA.DWG - 01/14/92

FIGURE 2

MONITORING WELL LOCATIONS 1943-1956 DISPOSAL AREA AND WEST BEACH LANDFILL NAVAL AIR STATION ALAMEDA, CALIFORNIA

Quality Control Board (RWQCB) and the Department of Health Services (DHS) which has since been renamed California EPA, Department of Toxic Substance Control (DTSC). Contaminants, including petroleum hydrocarbons and heavy metals, were identified in ground water and soil within the landfills during the investigations.

In September 1983, the RWQCB issued an Order of Closure for the West Beach Landfill, followed in October 1987 by a second order requiring the Navy to perform a SWAT at both the West Beach Landfill and the 1943-1956 Disposal Area. The SWAT requirements were incorporated into a remedial investigation/feasibility study (RI/FS) program. This program is currently in progress and addresses ground-water and soil investigations at 20 sites within NAS Alameda. Phases 5 and 6 of the RI/FS program, that specifically address the 1943-1956 Disposal Area and the West Beach Landfill, are currently in progress.

In September 1990, the DHS requested that existing ground-water monitoring wells at the 1943-1956 Disposal Area and the West Beach Landfill be sampled prior to the RI/FS study. Due to the age and poor construction of the existing monitoring wells, the RWQCB would not accept laboratory analyses of ground-water samples collected from the wells as valid results. The DHS later rescinded its original request to resample the existing monitoring wells and requested that all existing ground water-monitoring wells in the 1943-1956 Disposal Area and the West Beach Landfill be decommissioned.

The literature search identified 5 ground water monitoring wells that were installed at the 1943-1956 Disposal Area and 39 ground water monitoring wells that were installed at the West Beach Landfill (Figure 2). In October 1990, PRC conducted a site walk-through to locate the existing monitoring wells. All 5 wells at the 1943-1956 Disposal Area were located, but only 13 wells were located at the West Beach Landfill. Information on the original 44 wells is summarized in PRC's original work plan, *Well Decommissioning Plan: 1943-1956 Disposal Area and West Beach Landfill*, dated March 12, 1991. Table 1 summarizes information for the wells that could be found. In December 1991, the 18 ground-water monitoring wells that could be located were decommissioned.

1.2 PURPOSE

The purpose of this report is to summarize well decommissioning activities. Included in this report are a description of the well decommissioning method, the permit from Alameda County Flood Control District, a description of field methods used to decommission the wells, and a summary of data collected during well decommissioning.

TABLE 1

MONITORING WELL CONSTRUCTION DETAILS FOR DECOMMISSIONED WELLS

1943 - 1956 Disposal Area*

Monitoring Well No.	Formation Penetrated	Date Installed	Firm	Total Well Depth(ft)	Drill Method	Casing Diameter	Casing Type	Filter Pack Material	Bent. Seal Thickness	Grout Seal Thickness	Water Level (ft) From TOC	Month of Water Level Measurement
WA-1	Bay mud	10/84	Wahler and Associates	25	HSA	2 in.	PVC	PG	2 ft.	3 ft.	5	10/90
WA-2	Bay mud	10/84	Wahler and Associates	18	HSA	2 in.	PVC	PG	2 ft.	4 ft.	8	10/90
WA-3	Bay mud	10/84	Wahler and Associates	21	HSA	2 in.	PVC	PG	2 ft.	4 ft.	6	10/90
WA-4	Bay mud	10/84	Wahler and Associates	29	HSA	2 in.	PVC	PG	2 ft.	3 ft.	5	10/90
WA-5	Bay mud	10/84	Wahler and Associates	24	HSA	2 in.	PVC	PG	2 ft.	2 ft.	7	10/90

West Beach Landfill**

Monitoring Well No.	Formation Penetrated	Date Installed	Firm	Total Well Depth(ft)	Drill Method	Casing Diameter	Casing Type	Filter Pack Material	Bent. Seal Thickness	Grout Seal Thickness	Water Level(ft) From TOC	Month of Water Level Measurement
20GW	Fill Material	3/77	Harding Lawson	9	NA	3 in.	PVC	NA	NSV	NSV	5	10/90
26	Fill Material	NA	Not Available	15	NA	3 in.	PVC	NA	NSV	NSV	9	10/90
27	Fill Material	NA	Not Available	10	NA	3 in.	PVC	NA	NSV	NSV	9	10/90
28	Fill Material	NA	Not Available	7	NA	3 in.	PVC	NA	NSV	NSV	dry	10/90
29	Fill Material	NA	Not Available	9	NA	3 in.	PVC	NA	NSV	NSV	dry	10/90
30	Fill Material	NA	Not Available	8	NA	3 in.	PVC	NA	NSV	NSV	dry	10/90
31	Fill Material	NA	Not Available	8	NA	3 in.	PVC	NA	NSV	NSV	dry	10/90
33	Fill Material	NA	Not Available	10	NA	3 in.	PVC	NA	NSV	NSV	dry	12/91
34	Fill Material	NA	Not Available	15	NA	3 in.	PVC	NA	NSV	NSV	5	10/90
35	Fill Material	NA	Not Available	15	NA	3 in.	PVC	NA	NSV	NSV	4	10/90
36	Fill Material	NA	Not Available	10	NA	3 in.	PVC	NA	NSV	NSV	5	10/90
37	Fill Material	NA	Not Available	14	NA	3 in.	PVC	NA	NSV	NSV	5	10/90
39	Fill Material	NA	Not Available	18	NA	3 in.	PVC	NA	NSV	NSV	6	10/90

Notes:

FA = 6-inch Flight Auger
HSA = 8-inch Hollow-Stem Auger
HA = Hand Auger
NA = Not Available
TOC = Top of casing
NSV = No Seal Visible
PG = Pea Gravel
PVC = Polyvinyl Chloride
RW = 5-inch Rotary Wash

* Well construction details based on construction diagrams.

** Well construction details based on field check in October 1990 or December 1991 (MW 33).

2.0 WELL DECOMMISSIONING

The well decommissioning method recommended in the PRC Well Decommissioning Plan was to perforate the PVC casing in each well with a hydraulic knife and pressure-grout all well materials in place with cement-bentonite grout. This method was approved by the Alameda County Flood Control District, Zone 7 (Zone 7). Modifications to the Well Decommissioning Plan were made at the request of the DTSC (formerly the DHS). The modifications are described in a letter from the Navy to DHS dated August 8, 1991, and in a letter from DTSC to the Navy dated August 16, 1991. The well decommissioning procedure was finally summarized in a letter prepared by PRC and delivered to the Navy on September 25, 1991. Copies of correspondence and the Zone 7 well permit are presented in the Appendicies of this report. The well decommissioning procedure is briefly outlined below:

1. Cut the PVC casing in place.
2. Place a tremie pipe at the bottom of the well and pump grout in the well until the grout reaches the surface.
3. Apply pressure to the grout and maintain pressure until the grout sets up.
4. Remove the upper 2 feet of casing, and original well grout.
5. Fill the 2-foot void with hydrated bentonite.

2.1 FIELD METHODS

Field procedures used to decommission the wells are described below. The procedures were followed as closely as possible. However, several problems occurred and are discussed in Section 2.2.

1. A Microtip photoionization detector and a Bicron Surveyor 50 radiation detector were used to monitor organic vapors and radiation inside the PVC casing of each well. If measurements were above background readings, then an additional measurement was taken about 1 foot above the well.

2. The steel well casings were removed and the PVC casing cut as follows:

   a. For the wells installed by Wahler and Associates in the 1943-1956 Disposal Area, the upper 2 feet of grout seal and the steel protective casing around the PVC casing were removed with a jack hammer. For all other wells this step was unnecessary.

b. A PVC cutting knife was lowered to the bottom of each well by wireline. At the bottom of the well, the blades were hydraulically extended. The winch on the rig (Mobile B-53) was used to pull the PVC cutting knife from the bottom of the hole to approximately 2.5 feet below ground surface or 0.5 feet below the grout seal in the Wahler and Associates wells. As the cutting knife was pulled, the blades cut through the PVC casing.

3. Cement-bentonite grout was mixed in a 55-gallon drum according to the following procedure:

   a. Thirty-five gallons of water were poured into a drum followed by 10 pounds of powdered bentonite. The mixture was agitated with a mechanical mixer.

   b. After the bentonite was hydrated, 3.5 sacks of Portland Type I-II cement were added. The mixture was agitated with a mechanical mixer.

4. A PVC tee was placed on the wellhead. The tee extended out, over a drum. A tremie pipe was pushed through the straight part of the tee to the bottom of the well. Grout was pumped through the tremie pipe. Ground water at the bottom of the well was displaced up around the tremie pipe, and exited through the tee into the drum.

5. When grout was at the top of the PVC casing, the tee was removed. A 1-inch reducer was glued into a PVC coupling. A 1-inch gate valve was then threaded into the reducer. The other end of the coupling was glued over the wellhead. A flexible hose, through which the grout was pumped, was connected to the gate valve. With the valve open, additional grout was pumped under pressure into the monitoring well. After the grout was pumped, the valve was closed to attempt to maintain pressure in the well and the hose was removed.

   The volume of grout pumped into each well was calculated by the following procedure:

   a. Measure level of grout in drum (inches from top) before grouting begins.
   b. Measure level of grout in drum (inches from top) after grouting stops.

c. Volume of grout (cubic feet) pumped in well equals

$$\frac{\text{level before - level after}}{33 \text{ inches}} \times \frac{55 \text{ gallons}}{\text{drum}} \times \frac{1 \text{ cubic foot}}{7.48 \text{ gallons}}$$

(The depth of a drum is approximately 33 inches)

6. After the grout mixture set up in the wells (24 hours), the upper 2 feet of PVC casing (now containing grout) was removed. The upper 2 feet of casing was overdrilled with a hollow-stem auger rig. A 3-foot extension rod was attached to the rotating shaft on a portable disc sander. A 3-inch circular saw blade was then attached to the other end of the rod. The blade was lowered into the hole and used to cut the PVC casing. The grout-filled PVC casing was easily broken off when cut. The 2-feet deep hole was then filled with hydrated powdered bentonite.

   The above step was unnecessary for the Wahler and Associates wells because a 2-foot deep hole was dug during the removal of old grout and protective casing. A 6-inch PVC pipe was first placed in the hole over the well. The 6-inch pipe was employed due to the large hole resulting from the removal of the protective casing and grout. The void on the outside of the 6-inch PVC pipe was backfilled with soil and compacted. The inside of the 6-inch PVC pipe was filled with bentonite and hydrated with 5 gallons of water. The 6-inch pipe was then pulled out of the hole.

7. Debris from well decommissioning included old protective steel casing, broken grout from the Wahler and Associates wells, and the upper 2 feet of PVC casing from each well. This debris was disposed of as Class III waste. The horizontal location of each well was then surveyed by a California licensed surveyor. (The survey data is presented in Appendix C.)

8. A total of approximately 12 gallons of ground water were displaced during well decommissioning. The water was placed in one drum. The drum was labeled and stored in the drum storage area on the east side of Perimeter Road opposite from the staging area that is being used for the ongoing RI/FS.

2.2 FIELD ACTIVITIES

Before well decommissioning began, radiation and volatile organic vapors were monitored for health and safety purposes. Results are shown in Table 2. Due to the low readings, field activities were conducted using Level D personal protective equipment.

TABLE 2

RADIATION AND VAPOR MEASUREMENTS

DURING WELL DECOMMISSIONING

Well	Date	Radiation (mR/hr)			Organic Vapors (ppm)		
		background	in well	over well	background	in well	over well
WA-1	12/12/91	0.01	0.01	0.01	0.0	0.0	0.0
WA-2	12/12/91	0.01	0.01	0.01	0.0	0.0	0.0
WA-3	12/12/91	0.01	0.01	0.01	0.0	0.1	0.0
WA-4	12/12/91	0.01	0.01	0.01	0.0	1.7	0.0
WA-5	12/12/91	0.01	0.01	0.01	0.0	0.0	0.0
20GW	11/20/91	0.01	0.01	0.01	0.0	0.0	0.0
26	11/19/91	0.01	0.01	0.01	0.0	0.0	0.0
27	11/19/91	0.01	0.01	0.01	0.0	0.0	0.0
28	11/19/91	0.01	0.01	0.01	0.0	0.0	0.0
29	11/19/91	0.01	0.01	0.01	0.0	0.0	0.0
30	11/19/91	0.01	0.01	0.01	0.0	0.0	0.0
31	11/19/91	0.01	0.01	0.01	0.0	0.0	0.0
33	11/19/91	0.01	0.01	0.01	0.0	0.0	0.0
34	11/19/91	0.01	0.01	0.01	0.0	0.0	0.0
35	11/19/91	0.01	0.01	0.01	0.0	0.0	0.0
36	11/19/91	0.01	0.01	0.01	0.0	0.0	0.0
37	11/19/91	0.01	0.01	0.01	0.0	10.0	0.0
39	11/19/91	0.01	0.01	0.01	0.0	0.0	0.0

Notes: mR/hr = milliroentgens per hour
ppm = parts per million

All ground-water monitoring wells listed in the PRC Well Decommissioning Plan were decommissioned except for well 38. At this location, the upper 3 feet of PVC casing was found laying on the ground. An attempt was made to locate the well; however, the search was unsuccessful. A technician was sent out later to conduct a more thorough search with a shovel and auger rod. The technician was also unsuccessful in locating this well.

Monitoring well 33 was not previously located during the site walk-through conducted in October 1990. However, this well was found during the first day of well decommissioning. Monitoring well 33 was decommissioned with the same method used for similar wells.

Several problems occurred during well decommissioning that precluded strict adherence to the well decommissioning procedure. The types of problems encountered are listed below:

1. Pressure would not build up in the wells due to the following situations:

    a. Grout would rise to the ground surface around the outside of the PVC casing. Grouting was terminated when grout reached, and remained at, two feet below the surface.

    b. Grout leaked through a cracked wellhead. Grouting was terminated when this occurred. After the grout set up, additional grout was placed in the well to raise the level to 2 feet below the ground surface.

    c. Grout flowed freely into the formation. Grouting was terminated when approximately 1.5 to 2.0 drums of grout were pumped into the well. After the grout set up, additional grout were place in the well to raise the level to 2 feet below the ground surface.

    d. Open boring, no wellhead. Grout was pumped into the well to within 2 feet of the ground surface.

2. Pressure would build up initially, but would dissipate rapidly. When this occurred, the grout eventually flowed freely into the formation.

3. The cap on top of the wellhead would not hold. This occurred only on 3-inch wells. In this situation several attempts were made to clean the cap and wellhead and glue again. The fittings for the 3-inch wells were made of ABS (acrylonitrile-butadiene-

styrene) instead of PVC (polyvinyl chloride), and it is likely that the PVC glue would not adhere to the ABS material.

4. Sand flowed into the monitoring well after the PVC casing was cut. This occurred only in the 2-inch wells constructed by Wahler and Associates. Reportedly, pea gravel was used as the filter pack. Apparently, the pea gravel was incapable of holding back flowing sands.

5. The PVC casing started to rise out of the boring as pressure was applied to the grout. When this occurred, the pump was turned off and the valve on the wellhead was closed.

Various combinations of problems occurred in almost all of the wells and are identified in Table 3. In addition to these problems, it was observed in some wells that after the grout set up and the wellhead was removed, the level of grout was at least 4 feet below ground surface. This occurred in wells WA-3, WA-5, 35, and 37. Additional grout was added to these wells to raise the level of the grout to 2 feet below ground surface.

It is possible that applying pressure to the grout and maintaining pressure until the grout set up did not increase the effectiveness of well decommissioning. For example, the decommissioning of well 35 proceeded smoothly and approximately 50 pounds per square inch (psi) was applied to the grout. The valve on the wellhead was closed to maintain this pressure while the grout set up. After the grout set up and the wellhead was removed, it was observed that the level of grout in the well was about 6 feet below ground surface. In other words, the grout flowed freely into the formation. It is unknown if channeling of the grout occurred.

Another problem occurred during the decommissioning of monitoring well 36. During the initial stages of well decommissioning, the PVC casing cutter was lowered to the bottom of the well. The depth of the well was measured to be 10 feet below ground surface. As the casing cutter was raised with the winch, the PVC casing was raised out of the boring with the cutter. Approximately 15 feet of casing was pulled out of the hole; an unknown length of casing remained in the hole. Beyond a length of 10 feet, the casing was filled with soil. In an attempt to free the casing cutter from the casing, the upper 10 feet of casing broke off and the remainder fell back into the boring. The soil-filled casing was grouted in place.

During the final stages of decommissioning well 20GW near the tetrahedron (a wind direction indicator), it was discovered that a corrugated, aluminum pipe was placed over the PVC casing. The depth of the aluminum pipe is unknown. The annulus between the PVC casing and

TABLE 3
WELL DECOMMISSIONING DATA

Monitoring Well	Total Well Depth (ft) From TOC[5]	Filter Pack Length (feet)	Casing Diameter (inches)	Well Diameter (inches)	Total Volume of Void Space[2] (cubic feet)	Volume of Grout used (cubic feet)	Estimated Volume of Water Displaced (gallons)	Estimated Pressure (psi)[3]	Comments
WA-1	25	20	2	8	2.5	8.5	0	50	B, D, A1
WA-2	18	12	2	8	1.5	1.3	0	0	A2
WA-3	21	15	2	8	1.9	1.8	0	0	A2, D, A1, F
WA-4	29	24	2	8	2.9	8.2	0	100	A3, D
WA-5	24	20	2	8	2.4	10.0	0	0	A3, A4, F
20GW	9	7[4]	3	8[1]	1.0	2.0	1	75	A1
26	15	13[4]	3	8[1]	1.8	7.1	1	0	A3
27	10	8[4]	3	8[1]	1.1	2.0	0	0	E, C, A3
28	7	5[4]	3	8[1]	0.7	1.1	0	0	C
29	9	7[4]	3	8[1]	1.0	3.3	0	50	A1
30	8	6[4]	3	8[1]	0.8	0.4	0	50	E
31	8	6[4]	3	8[1]	0.8	0.3	0	0	C
33	10	8[4]	3	8[1]	1.1	1.3	0	50	A1
34	15	13[4]	3	8[1]	1.8	2.7	4	50	A1
35	15	13[4]	3	8[1]	1.8	6.9	2	50	F
36	10	8[4]	3	8[1]	1.1	2.7	0	0	A4
37	14	12[4]	3	8[1]	1.7	10.2	2	0	A3
38	11	9[4]	3	8[1]	1.3	could not locate			
39	18	16[4]	3	8[1]	2.2	6.0	2	50	F

TABLE 3 (Continued)
WELL DECOMMISSIONING DATA

Notes:

1 Assumed.
2 Includes volume of well and 30 percent of filter pack volume.
3 psi = pounds per square inch. Pressure is estimated, pressure gage on drill rig not working. The maximum capacity of pump on the rig is 300 psi.
4 Since well construction details are not available, two feet were subtracted from total well depth to account for surface seal of the well. The upper 2 feet were filled with hydrated bentonite.
5 TOC = Top of casing.

Comments:

A. Pressure would not build up due to:

A1. Grout surfaced on outside of casing.
A2. Grout leaked through cracked wellhead.
A3. Grout flowed freely into formation.
A4. Open boring, no wellhead.

B. Pressure increased to a maximum value, then dissipated rapidly.
C. Cap on top of wellhead would not hold.
D. Formation sand flowed into monitoring well after casing was cut.
E. The PVC casing started to rise after pressure was applied to grout.
F. Level of grout in well, after grout set up, was at least 4 feet below ground surface. Additional grout was poured in well to bring grout level up to 2 feet below ground surface.

the aluminum pipe was approximately 1.5 inches and was filled with soil. The upper 2 feet of aluminum pipe and PVC casing were removed.

The objective of well decommissioning was to fill the inside of the PVC casing and the void space in the filter pack of each well with as much grout as possible. The volume inside each PVC casing was calculated based on well construction details or measurements made in the field. The porosity of each filter pack was assumed to be 30 percent. The calculated total void space volumes are shown in Table 3 for comparison.

The volume of grout pumped into wells WA-2, WA-3, 30, and 31 was less than the calculated total void space of the filter pack and the inside of the PVC casing. The percentage of grout emplaced in the wells was 87% of total void space for WA-2 and 95% of the total void space for WA-3. Since construction diagrams were available for WA-2 and WA-3, the difference between void space and volume of grout pumped can possibly be attributed to calculation errors based on assumptions of the total filter pack void space. These errors could have resulted from overestimating the extent of the filter pack or from the possible clogging of filter pack with native fine-grained material.

The differences in volume of grout pumped into the well and the calculated total void space were significant for wells 30 (50% of total void space) and 31 (38% of total void space). The differences in grout acceptance in these two wells can possibly be attributed to the following:

- Casing was not cut or perforated below the screened interval due to buildup of sediment in the casing (compacted sediment created a false bottom), or

- Filter pack was clogged with fine-grained native material that would not allow the grout to move into the filter pack.

In either case the grout would not enter the filter pack resulting in placement of less grout than calculated.

Since construction diagrams were not available for wells 30 and 31, a conclusive explanation for what occurred cannot be provided.

3.0 SUMMARY

At the request of DHS/DTSC, a total of 18 ground-water monitoring wells at the 1943-1956 Disposal Area and West Beach Landfill, NAS Alameda, were decommissioned in accordance with Zone 7 and DTSC requirements. The monitoring wells were pressure grouted. The 18 monitoring wells listed in the PRC Well Decommissioning Plan were decommissioned with the following exceptions:

1. Monitoring well 38 could not be relocated and therefore was not decommissioned.

2. Monitoring well 33 was located and decommissioned. (This well was not located during the site walk in October 1990.)

Well decommissioning proceeded as planned in all but 4 of the wells. Monitoring wells WA-2, WA-3, 30, and 31 accepted less grout than anticipated. Monitoring wells WA-2 and WA-3 received less grout than expected possibly due to an overestimation of the filter pack extent or due to filter pack clogging with fine grained native materials. For monitoring wells 30 and 31, possible explanations are the cuts in the casing may not have extended into the screened interval or the filter pack may have been clogged with fine grained native materials. The well construction diagrams for monitoring wells 30 and 31 were not available.

APPENDIX A
CORRESPONDENCE

STATE OF CALIFORNIA—HEALTH AND WELFARE AGENCY PETE WILSON, *Governor*

DEPARTMENT OF HEALTH SERVICES
TOXIC SUBSTANCES CONTROL PROGRAM
700 HEINZ AVE., BLDG. F, SUITE 200
BERKELEY, CA 94710-2737

June 17, 1991

Mr. Wing Wong, Code 1811WW
Western Division
Naval Facilities Engineering Command
P.O. Box 727
San Bruno, CA 94066-0720

Dear Mr. Wong:

DHS COMMENTS ON WELL DECOMMISSIONING METHOD, NAVAL AIR STATION, ALAMEDA

This letter is in response to your letter to DHS: 5090 Ser 1813EG/00722, dated June 4, 1991.

The following are the recommendations of DHS with respect to the proposed well decommissioning method.

1. The bentonite employed should be non-beneficiated bentonite.

2. Specify the cement to be used. Cement without additives is recommended.

3. The tremmie pipe should be kept at the bottom of the well while the cement bentonite grout is introduced into the well. Or, the tremmie pipe should be placed at least twenty feet below the level of the grout in the well.

4. The compressive strength of the cement bentonite grout should be specified.

5. Pre-hydrate the bentonite before adding the cement.

6. A ratio of 8-10 gallons of water to a sack of cement should not be exceeded. The water should be measured in the field.

7. Calculate the approximate volume of the sandpack and the minimum amount of cement to be placed in the well.

8. The bentonite in the mix should not exceed six percent by weight. Weigh the bentonite with a scale in the field.

9. Perform a radioactive check on the water displaced to the surface.

10. Maintain well decommissing logs and include the logs in the report. Field monitoring and sample analysis should be performed.

11. Survey the wells that are decommissioned.

12. Specify the pressure to be applied. Maintain pressure until the grout sets-up.

13. Include with the report any information available on well construction.

14. Casings that extent above the ground surface should be cut to ground surface.

15. Well water that is displaced to the surface and pumped into drums should be analysed immediately for all suspected contaminants. The date of collection and the date of sampling from the drum for analysis should be noted on the drum.

16. Removal of the upper two feet of casing, seal and filter pack is preferred to pressure grouting to the surface. Pressure grouting the wells to the surface may pose a problem with respect to future land use. A wide range of land uses would require removal in the future. The concerns that are raised about health and safety are legitimate concerns. But, materials grouted in place may be more costly to remove in the future and identical health and safety concerns will apply at that time.

17. Check with the base engineering unit to determine if base restrictions exist which would disallow pressure grouting to the surface.

Please call Eileen Hughes at (415) 540-3848, if you have any questions.

Sincerely,

Eileen Hughes

Eileen Hughes
Waste Management Engineer
Site Mitigation Branch
Region 2
Toxic Substances Control Program

cc: See attached page

cc: PRC Environmental Management, Inc.
11030 White Rock Road
Rancho Cordova, CA 95670
Attn: Kirk Switzer

James Montgomery Engineers
365 Lennon Lane
Walnut Creek, CA 94598
Attn: Steve Newton

NAS Alameda
Alameda, CA 94501
Attn: Randy Cate
Commanding Officer

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
5997 PARKSIDE DRIVE • PLEASANTON, CALIFORNIA 94588 • (415) 484-2600

23 July 1991

PRC Environmental Management
11030 White Rock Road
Rancho Cordova, CA 95670

Gentlemen:

We have not received the report required by Drilling permit 91232. This permit was issued to you on 26 April 1991 for the destruction of wells 1S/4W 32N80, 32N81, 2S/4W 5C80 to 5C82, 5J80, 5L80 to 5L82, 5M80 to 5M82, 5P80 to 5P82 and 5Q81 to 5Q82. Notice of start of work was given for 15 May 1991.

Please submit the required destruction report or a letter explaining why the report cannot be submitted at this time. The report should include a description of methods and materials used to destroy the wells, location sketch, date of destruction, and permit number. Please submit your report or letter so that it is received within ten days of the date of this letter.

If your report or letter is not received within the ten-day period, your project will not be in compliance with Alameda County Ordinance 73-68, and we may restrict the issuance of future permits to your firm.

If you have any questions concerning this matter, please contact Wyman Hong or me at 484-2600.

Very truly yours,

Craig A. Mayfield

Craig A. Mayfield
Water Resources Engineer

WH:mm

001976

1991

DEPARTMENT OF THE NAVY
WESTERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P.O. BOX 727
SAN BRUNO, CALIFORNIA 94066-0720

IN REPLY REFER TO:
5090
Ser 1811WW/00785

8 AUG 1991

Ms Eileen Hughes
Department of Health Services
Site Mitigation Branch
Toxic Substances Control Program
700 Heinz Ave., Bldg. F, Suite 200
Berkeley, CA 94710-2737

Subj: REPONSE TO DHS COMMENTS ON WELL DECOMMISSIONING METHOD, NAVAL AIR STATION, ALAMEDA

Enclosure (1) is our response to the Department of Health Services' (DHS) comments of June 17, 1991 on the well decommissioning method for Naval Air Station (NAS), Alameda. Upon receipt of approval from the DHS the Navy will proceed with the preparation of an addendum to the Health and Safety Plan, revise the well decommissioning procedure, and proceed with the well decommissioning.

If you have any further questions regarding this matter, please contact Mr. Wing Wong, Code 1811WW at (415) 244-2537.

RICHARD SERAYDARIAN
Head, Installation Restoration Section

Encl:
(1) Response to DHS comments on Well Decommissioning

Copy to:
California Regional Water Quality Control Board (Attn: Lester Feldman)
PRC Sacramento (Attn: Kirk Switzer)
James M. Montgomery (Attn: Steve Newton) — ?
NAS Alameda (Attn: Randy Cate)

001980

AUG

PRC RESPONSE TO DHS COMMENTS (DATED JUNE 17, 1991)
ON WELL DECOMMISSIONING METHOD
NAVAL AIR STATION, ALAMEDA

For the convenience of the reader, the DHS comments are repeated in bold print. PRC's response follows the comments.

1. **The bentonite employed should be non-beneficiated bentonite.**

PRC response: Powdered bentonite, free of impurities or additives that could affect the quality of ground water, will be used.

2. **Specify the cement to be used. Cement without additives is recommended.**

PRC response: Type I or II Portland Cement will be used.

3. **The tremie pipe should be kept at the bottom of the well while the cement bentonite grout is introduced into the well. Or the tremie pipe should be placed at least twenty feet below the level of the grout in the well.**

PRC response: All 18 wells will be decommissioned by placing the tremie pipe at the bottom of the well.

4. **The compressive strength of the cement bentonite grout should be specified, as well as expected time to set-up.**

PRC response: The expected time for the cement bentonite grout mixture to set up is approximately 24 hours. Based on California Department of Water Resources Bulletin 74-90, Final Draft, January 1990, no specific compressive strength is required for grout mixtures. However, the grout mixture

ENCLOSURE (1)

will comply with DHS guidelines on content of water, bentonite, and Type I or II Portland Cement.

5. **Pre-hydrate the bentonite before adding the cement.**

PRC response: Bentonite will be prehydrated before being added to the cement.

6. **A ratio of 8 to 10 gallons of water to a sack of cement should not be exceeded. The water should be measured in the field.**

PRC response: A ratio of 10 gallons of water to a sack of cement will not be exceeded, and the water will be measured prior to mixing.

7. **Calculate the approximate volume of the sandpack and the minimum amount of cement to be placed in the well.**

PRC response: The volume of the sandpack will be calculated based on well construction details listed in the Well Decommissioning Plan. The total volume of grout to be placed in the well will also be calculated.

8. **The bentonite in the mix should not exceed six percent by weight. Weigh the bentonite with a scale in the field.**

PRC response: Powdered bentonite will be measured in the field prior to mixing and will not exceed 6 percent by weight.

9. **form a radioactive check on the water displaced to the surface.**

PRC response: Analyses of ground-water samples that were collected for the Solid Waste Assessment Test (SWAT) will be reviewed before well decommissioning begins. If the analyses indicate the presence of radioactive material in ground water, a Geiger-Muller counter will be used on SWAT-identified wells to monitor for radiation.

10. **Maintain well decommissioning logs and include the logs in the report. Field monitoring and sample analysis should be performed.**

PRC response: As mentioned in the Well Decommissioning Plan, daily activities that take place during well decommissioning will be documented.

DHS comment No. 16 changes the scope of work that was previously accepted by DHS. Excavation of near-surface soil is now required. Therefore, field monitoring instruments are now recommended. Monitoring equipment that will be used during well decommissioning will depend on what was monitored during installation of the monitoring wells for the SWAT. Monitoring equipment used for the installation of wells for the SWAT included a geiger-muller counter, organic vapor analyzer, radiation badges, noise dosimeter, particulate indicator, and Lower Explosion Limit meters for oxygen and hydrogen sulfide.

11. **Survey the wells that are decommissioned.**

PRC response: After the 18 monitoring wells have been decommissioned, their horizontal location will be surveyed.

12. **Specify the pressure to be applied. Maintain pressure until the grout sets-up.**

PRC response: The minimum pressure required to tremie cement-bentonite grout to the surface, with the tremie pipe at the bottom of the hole, will be calculated. The pressure calculated will be presented as a range and will be based on a slurry density ranging from 100 to 115 lbs/ft^3. The

actual pressure required may be higher in order for the grout to infiltrate through the filter pack. The pressure recorded in the field will be documented.

13. **Include with the report any information available on well construction.**

PRC response: This information has been provided in the Well Decommissioning Plan on page 14.

14. **Casings that extend above the ground surface should be cut to ground surface.**

PRC response: Casing for all monitoring wells will be cut off two feet below the ground surface.

15. **Well water that is displaced to the surface and pumped into drums should be analyzed immediately for all suspected contaminants. The date of collection and the date of sampling from the drum for analysis should be noted on the drum.**

PRC response: Well water that is displaced to the surface during well decommissioning will be analyzed for disposal purposes, not for characterization. The analytes to be analyzed for will be selected after analyses of ground-water samples collected for the SWAT have been reviewed and potential analyses for disposal purposes have been identified.

16. **Removal of the upper two feet of casing, seal and filter pack is preferred to pressure grouting to the surface. Pressure grouting the wells to the surface may pose a problem with respect to future land use. A wide range of land uses would require removal in the future. The concerns that are raised about health and safety are legitimate concerns. But materials grouted in place may be more costly to remove in the future and identical health and safety concerns will apply at that time.**

PRC Reponse: The upper two feet of casing, seal and filter pack will be removed. The void area will be filled with cement bentonite grout to the ground surface.

17. **Check with the base engineering unit to determine if base restrictions exist which would disallow pressure grouting to the surface.**

PRC response: Restrictions to pressure grouting to the surface will be discussed with Naval Air Station, Alameda, officials before work commences.

STATE OF CALIFORNIA - ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, Governor

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
700 HEINZ AVE., SUITE 200
BERKELEY, CA 94710

August 16, 1991

Mr. Wing Wong, Code 1811WW
Western Division
Naval Facilities Engineering Command
P.O. Box 727
San Bruno, CA 94066-0720

Dear Mr. Wong:

NAS RESPONSE TO DHS COMMENTS ON THE PROPOSED REVISIONS TO THE WELL DECOMMISSIONING METHOD AT THE NAVAL AIR STATION, ALAMEDA

This letter is in response to your letter to DHS: 5090 Ser 1811WW/00785, received at August 8, 1991.

The Department of Toxic Substances Control (DTSC, formerly the Toxic Substances Control Program under the Department of Health Services) concurs with the response to comments on the well decommissioning method as noted, with the exception of the response to comment number sixteen. For comment number sixteen, DTSC recommends that, following the removal of the upper two feet of well pipe, the upper two feet of void space be filled with bentonite, not cement bentonite grout as noted in the Navy's response to comments.

Please call Eileen Hughes at (415) 540-3848, if you have any questions.

Sincerely,

Eileen Hughes

Eileen Hughes
Waste Management Engineer
Site Mitigation Branch

001981

cc: See Attached Page

AUG

PRC Environmental Management, Inc.
11030 White Rock Road
Suite 190
Rancho Cordova, CA 95670
916-852-8300
Fax 916-852-0307

PRC

September 25, 1991

Mr. Wing Wong, Code 1811WW
Department of the Navy
Western Division
Naval Facilities Engineering Command
900 Commodore Way, Building 101
San Bruno, CA 94066-0720

CLEAN Contract No. N62474-88-D-5086
Contract Task Order No. 0095

Subject: Well Decommissioning Method, Naval Air Station, Alameda

Dear Mr. Wong:

Enclosed is the well decommissioning procedure that will be used to decommission wells at the West Beach Landfill and the 1943-1956 Disposal Area at NAS Alameda. It is assumed that no additional modifications to the well decommissioning procedure will be made and that no further approval from the Navy or the California Environmental Protection Agency, Toxic Substances Control Programs, will be required.

Well decommissioning will begin after 1) well abandonment permits have been obtained from Alameda and San Francisco Counties, and 2) a kickoff meeting among PRC, Guess Drilling, NAS Alameda, and WESTDIV is held. If you have any questions, please call me at 916/852-8300.

Sincerely,

Jeffrey J. Johnson

Jeffrey J. Johnson
Geological Engineer

Attachment

001991

WELL DECOMMISSIONING PROCEDURE

The well decommissioning procedure outlined in this report will be used to decommission old monitoring wells at the 1943-1956 Disposal Area and the West Beach Landfill at Naval Air Station (NAS) Alameda. The original well decommissioning plan was presented in PRC's Well Decommissioning Plan: 1943-1956 Disposal Area and West Beach landfill, January 24, 1991. Subsequent modifications to the well decommissioning procedure have been requested by the California Environmental Protection Agency, Toxic Substances Control Programs, (formerly part of the Department of Health Services). The modifications are described in the following correspondence and meeting:

1) Letter from the Navy to the California Department of Health Services, dated August 8, 1991. Subject: Response to DHS Comments on Well Decommissioning Method, Naval Air Station Alameda.

2) Letter from the Department of Toxic Substances Control to the Navy, dated August 16, 1991. Subject: Response to letter in Item No. 1.

3) Discussions conducted during the Progress Review Meeting for NAS Alameda, held in Emeryville on September 17, 1991. These discussions confirmed the following modifications to the well decommissioning procedure:

   a) The upper 2 feet of filter pack around each monitoring well will not be removed, only the upper 2 feet of PVC casing and grout seal will be removed. Therefore, no soil disposal is required.

   b) Ground water that is displaced from grouting procedures does not have to be analyzed immediately. Ground-water samples will be collected and analyzed for disposal purposes. The contaminants that will be analyzed for in the ground-water samples will be selected after laboratory analyses of ground-water samples collected during the SWAT have been reviewed.

In accordance with EPA regulations, ground water generated during well decommissioning will be disposed of within 90 days. The well decommissioning procedure is described below.

1. The PVC casing will be cut 2 feet below ground surface and removed. A grout seal exists in the five monitoring wells at the 1943-1956 Disposal Area. The upper two feet of this grout seal will also be removed. This material will be temporarily stockpiled. Disposal will be coordinated with the NAS Alameda environmental officer.

2. PVC casing and screen will be punctured with a casing knife from the bottom of the well to the top of the PVC pipe.

3. A cement-bentonite grout mixture will be prepared for emplacement in the wells. The bentonite in the mix will not exceed six percent by weight. Powdered bentonite, free of impurities, will be prehydrated before being added to the cement. Type I or II Portland Cement will be used. A ratio of 10 gallons of water to one sack of cement will not be exceeded. Bentonite, cement, and water will be measured in the field prior to being mixed.

   The volume of grout mixture to be prepared for each well is listed in Table 1. The volume is based on well construction details listed in PRC's Well Decommissioning Plan, 1991. The volume of grout mixture to be placed in each well may be the total volume of void space (casing volume plus 30% of filter pack volume) plus 10 percent.

4. A tremie pipe will be placed at the bottom of the well. The grout mixture will be tremmied under pressure into each well. An attempt will be made to maintain this pressure until the grout sets up. Anticipated pressures required to push the grout to the top of the PVC casing are listed in Table 1. In wells installed below the water table, water may be displaced to ground surface ahead of the grout mixture. This water will be pumped into drums. Water from several wells may be contained in the same drum. The drums will be labeled and moved to a designated storage area. A water sample will be collected from each drum and analyzed for disposal purposes.

   When the grout is at the top of the PVC casing, a cap with a 1-inch diameter hole will be glued to the top of the casing and a pump will be attached to the cap. Pressure will be applied to the grout mixture and additional grout mixture, not to exceed 10 percent of the volume of the base hole, will be added. After the desired amount of grout has been pumped into the casing, the cap will be removed and grout will be brought to the top of the PVC casing.

5. The 2-foot deep void left from the removal of the upper two feet of casing and seal will be filled with hydrated bentonite; no cement will be added.

A summary report documenting field procedures and materials used, as well as any problems encountered, will be prepared.

TABLE 1: Required volume of grout mixture to be added to monitoring wells to be decommissioned.

Monitoring Well	Depth (feet)	Filter Pack Thickness (feet)	Casing Diameter (inches)	Well Diameter (inches)	Gross Volume Filter Pack (cubic feet)	Volume of Well (cubic feet)	Total Volume of Void Space[2] (cubic feet)	Total Volume plus 10% (cubic feet)	Minimum Pressure (psi)[3]
WA-1	25	20	2	8	6.55	0.55	2.52	2.8	16
WA-2	18	12	2	8	3.93	0.39	1.57	1.7	11
WA-3	21	15	2	8	4.91	0.46	1.93	2.1	13
WA-4	29	24	2	8	7.86	0.63	2.99	3.3	19
WA-5	24	20	2	8	6.55	0.52	2.49	2.7	15
20GW	9	7	3	8[1]	2.1	0.44	1.07	1.2	5
26	15	13	3	8[1]	3.9	0.74	1.91	2.1	9
27	10	8	3	8[1]	2.4	0.49	1.21	1.3	6
28	7	5	3	8[1]	1.5	0.34	0.79	0.9	3
29	9	7	3	8[1]	2.1	0.44	1.07	1.2	5
30	8	6	3	8[1]	1.8	0.39	0.93	1.0	4
31	8	6	3	8[1]	1.8	0.39	0.93	1.0	4
34	15	13	3	8[1]	3.9	0.74	1.91	2.1	9
35	15	13	3	8[1]	3.9	0.74	1.91	2.1	9
36	10	8	3	8[1]	2.4	0.49	1.21	1.3	6
37	14	12	3	8[1]	3.6	0.69	1.77	1.9	8
38	11	9	3	8[1]	2.7	0.54	1.35	1.5	6
39	18	16	3	8[1]	4.8	0.88	2.32	2.6	11
							Total	32.8	

Notes:

1: assumed
2: assumes filter pack porosity equals 30 percent.
3: psi = pounds per square inch, based on a slurry density of 100 pounds per cubic foot.

APPENDIX B
PERMIT

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
5997 PARKSIDE DRIVE • PLEASANTON, CALIFORNIA 94588 • (415) 484-2600

26 April 1991

PRC Environmental Management, Inc.
11030 White Rock Road, Suite 190
Rancho Cordova, CA 95670

Gentlemen:

Enclosed is Groundwater Protection Ordinance permit 91232 for the destruction of eighteen monitoring wells at the Naval Air Station in Alameda.

Please note that permit condition A-2 requires that a well destruction report be submitted after completion of the work. The report should include a description of methods and materials used to destroy the wells, location sketch, date of destruction, and permit number.

If you have any questions, please contact Wyman Hong or me at 484-2600.

Very truly yours,

Craig A. Mayfield

Craig A. Mayfield
Water Resources Engineer

WH:mm
Enc.

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE • PLEASANTON, CALIFORNIA 94588 • (415) 484-2600

GROUNDWATER PROTECTION ORDINANCE PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT Naval Air Station - Alameda
1943-1956 Disposal Area and West Beach
Landfill (See attached figures)

CLIENT
Name Bella Dizon-Dept. of the Navy, Western Div.-18BBD
Address 900 Commodore Way Phone 415/244-2564 Bldg. 101
City San Bruno, CA Zip 94066-0720

APPLICANT
Name Jeff Johnson/Greg Reller
PRC Environmental Management
Address 11030 White Rock Rd. Phone 916/852-8300
City Rancho Cordova, CA Zip 95670

TYPE OF PROJECT

Construction		Geotechnical Investigation	
Cathodic Protection	___	General	___
Water Supply	___	Contamination	___
Monitoring	___	Well Destruction	X

PROPOSED WATER SUPPLY WELL USE
Domestic ___ Industrial ___ Other ___
Municipal ___ Irrigation ___

DRILLING METHOD:
Mud Rotary ___ Air Rotary ___ Auger ___
Cable ___ Other ___

DRILLER'S LICENSE NO. To be furnished upon driller's selection.

WELL PROJECTS See attached table
Drill Hole Diameter ___ in. Maximum
Casing Diameter ___ in. Depth ___ ft.
Surface Seal Depth ___ ft. Number ___

GEOTECHNICAL PROJECTS
Number of Borings ___ Maximum
Hole Diameter ___ in. Depth ___ ft.

ESTIMATED STARTING DATE 15 May 91
ESTIMATED COMPLETION DATE 20 May 91

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE [signature] Date 23 APRIL 91

FOR OFFICE USE

PERMIT NUMBER 91232
LOCATION NUMBER 1S/4W 32N80, 32N81, 2S/4W 5C80 to 5C82, 5J80, 5L80 to 5L82, 5M80 to 5M82, 5P80 to 5P82 and 5Q81 to 5Q82.

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

B. WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

(E.) WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 26 Apr 91
Wyman Hong

121989

26 April 1991

ZONE 7
WATER RESOURCES ENGINEERING
GROUNDWATER PROTECTION ORDINANCE

ALAMEDA NAVAL AIR STATION
MAIN STREET AND ATLANTIC AVENUE
ALAMEDA
WELLS 1S/4W 32N80, 32N81,
2S/4W 5C80, 5C81, 5C82, 5J80,
5L80, 5L81, 5L82, 5M80, 5M81,
5M82, 5P80, 5P81, 5P82, 5Q80,
5Q81 AND 5Q82
PERMIT 91232

Destruction Requirements

1. Clean out all bridged or poorly compacted materials to the bottom of the well.

2. Perforate or otherwise puncture the casing below the concrete seal, where and as necessary, to allow the sealing material to fill the voids of the gravel pack in the seal zone.

3. Pressure grout the casing to 2 feet below finished grade or original ground, whichever is the lower elevation.

4. Remove casing, seal and gravel pack to 2 feet below finished grade or original ground, whichever is the lower elevation.

5. After the seal has set, backfill the remaining hole with compacted material.

These destruction requirements as proposed by Gregory Reller of PRC Environmental Management meet or exceed Zone 7 minimum requirements.

FILE

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
5997 PARKSIDE DRIVE • PLEASANTON, CALIFORNIA 94588 • (510) 484-2600

8 October 1991

PRC Environmental Management
11030 White Rock Road
Rancho Cordova, CA 95670

Gentlemen:

Enclosed is Drilling permit 91579 for the destruction of wells 1S/4W 32N80, 32N81, 2S/4W 5C80, 5C81, 5C82, 5J80, 5P80 and 5P81 at Naval Air Station in Alameda for the Department of the Navy.

Please note that permit condition A-2 requires that a well destruction report be submitted after completion of the work. The report should include a description of methods and materials used to destroy the well, location sketch, date of destruction, and permit number.

If you have any questions, please contact Wyman Hong or me at 484-2600.

Very truly yours,

Craig A. Mayfield

Craig A. Mayfield
Water Resources Engineer

WH:mm
Enc.

002291

7 October 1991

ZONE 7
WATER RESOURCES ENGINEERING
GROUNDWATER PROTECTION ORDINANCE

DEPARTMENT OF THE NAVY
NAVAL AIR STATION
ALAMEDA
WELLS 1S/4W 32N80, 32N81,
2S/4W 5C80, 5C81, 5C82, 5J80
5P80 AND 5P81
PERMIT 91579

Destruction Requirements

1. Clean out all bridged or poorly compacted materials to the bottom of the well.

2. Pressure grout the casing to 2 feet below finished grade or original ground, whichever is the lower elevation.

3. Remove casing, seal and gravel pack to 2 feet below finished grade or original ground, whichever is the lower elevation.

4. After the seal has set, backfill the remaining hole with compacted material.

These destruction requirements as proposed by Jeff Johnson of PRC Environmental Management meet or exceed Zone 7 minimum requirements.

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE • PLEASANTON, CALIFORNIA 94588 • (415) 484-2600

GROUNDWATER PROTECTION ORDINANCE PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT West Beach Landfill 1943-56 Disposal Area; Naval Air Station Alameda

CLIENT
Name Wing Wong; Dept. of the Navy, Western Division
Address 900 Commodore Way Phone (415) 244-2537 Bldg 101
City San Bruno, CA Zip 94066-0720

APPLICANT
Name Jeff Johnson
PRC Environmental Management.
Address 11030 White Rock Rd. Phone (916) 852-8300
City Rancho Cordova CA Zip 95670

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	___	General	___
Water Supply	___	Contamination	___
Monitoring	___	Well Destruction	X

PROPOSED WATER SUPPLY WELL USE
Domestic ___ Industrial ___ Other ___
Municipal ___ Irrigation ___

DRILLING METHOD:
Mud Rotary ___ Air Rotary ___ Auger ___
Cable ___ Other ___

DRILLER'S LICENSE NO. Guess Drilling - 605128

WELL PROJECTS See Well Decommissioning Plan
Drill Hole Diameter ___ in. Maximum
Casing Diameter ___ in. Depth ___ ft.
Surface Seal Depth ___ ft. Number ___

GEOTECHNICAL PROJECTS
Number of Borings ___ Maximum
Hole Diameter ___ in. Depth ___ ft.

ESTIMATED STARTING DATE Oct 21 1991
ESTIMATED COMPLETION DATE Oct 25 1991

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Jeff Johnson Date Sept. 25, 1991

FOR OFFICE USE

PERMIT NUMBER 91579
LOCATION NUMBER 1S/4W 32N80, 32N81, 2S/4W 5C80, 5C81, 5C82, 5J80, 5P80 and 5P81

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

B. WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

(E.) WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 7 Oct 91
Wyman Hong

121989

APPENDIX C
SURVEY DATA

JOHN E. KOCH
LAND SURVEYOR
CA State Lic. No. 004811
5427 TELEGRAPH AVENUE, SUITE A
OAKLAND, CA 94609
(510)655-9956
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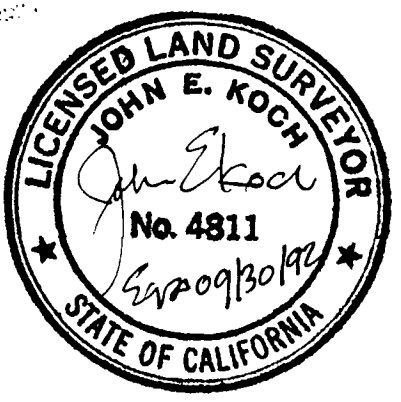

LE NAME IS 91082 PRC PROJ.044-0095
ANDONED GROUND WATER WELL LOCATIONS

PT#	NORTHING	EASTING	DESCRIPTION
1	476203.342	1471576.788	WA-1
2	476639.276	1471338.130	WA-2
3	475771.141	1471396.286	WA-3
4	475377.530	1471374.606	WA-4
5	476998.834	1471273.350	WA-5
20	473417.920	1474477.032	MW-20
26	471683.075	1472733.579	MW-26
27	471698.651	1472504.506	MW-27
28	471722.916	1472264.120	MW-28
29	471776.427	1471636.985	MW-29
30	471818.528	1471138.373	MW-30
31	471960.368	1470924.821	MW-31
33	472659.411	1470924.841	MW-33
34	473674.587	1471064.931	MW-34
35	473662.077	1471102.896	MW-35
36	473813.217	1471091.407	MW-36
37	473803.606	1471125.811	MW-37
39	473949.477	1471154.404	MW-39
102	475921.390	1471536.566	REBAR W/SCRI
103	474404.095	1471705.924	REBAR & CAP
107	471652.686	1472982.131	1/2" BR PLUG
109	473302.387	1475457.235	1/2" BR PLUG
170	470402.752	1475594.157	C/L R'WAY 31
171	477286.879	1471488.090	C/L R'WAY 13
711	477061.747	1471138.512	CTR M-001-A
861	471703.030	1472345.959	CTR M-016-A
951	474927.067	1471252.647	CTR M-025-A
091	473158.130	1475063.276	CTR M-109-A

NOTE:Coordinates are California State Zone III, NAD27.

OAKLAND INNER HARBOR

RUNWAY 13

INSTRUMENT RUNWAY 31

▲109

○ JMM-M-109-A

● MW-20

△ TETRAHEDRON

NORTH

LEGEND:

⊕ INSTALLED BY WAHLER ASSOC. 1985
● ABANDONED WELLS
● INSTALLED BY HARDING LAWSON, 1976, 1977
○ INSTALLED BY JMM 1991
● REBAR
▲ USN BRASS PLUG

▲107

MW-26

MW-27

○ JMM-M-016-A

MW-28

ALAMEDA COUNTY & CITY / CITY & COUNTY OF SAN FRANCISCO

WEST BEACH LANDFILL

SAN FRANCISCO BAY

MW-29

MW-30

MW-31

MW-33

MW-34

MW-35

MW-36

MW-37

MW-39

103 ● REBAR W/CAP

102 ● REBAR W/SCRIBE

⊕ WA-1

⊕ WA-2

⊕ WA-3

⊕ WA-4

⊕ WA-5

○ JMM-M-025A

○ JMM-M-001-A

SAN FRANCISCO BAY

LICENSED LAND SURVEYOR
JOHN E. KOCH
No. 4811
STATE OF CALIFORNIA

SURVEY OF: MONITORING WELL LOCATIONS NAVAL AIR STATION ALAMEDA CA

FOR: PRC ENVIRONMENTAL MANAGEMENT INC

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PHONE (415) 655 9956

Scale: 1"=600'	Checked: JEK	Drawn: JMM
Date: 01-08-92	App'd: JEK	Job No.: 91082